POSTGRADUATE STUDENT WEBSITE PROFILE

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| Registration Number | J80/53676/2018 |
| Level (Masters / PhD) | PhD |
| Full Names | Dr. Nicholas Musyoki Ngwili |
| Clear half body Photo(Not the face only ) |  |
| Student Short Biography (Max 250 words) | Dr Nicholas Ngwili is Livestock scientist currently working a post-doctoral research scientist at the International Livestock Research Institute (ILRI) in Kenya. My research interests are the control of zoonotic diseases using a One Health approach particularly understanding the contextual issues, incentives and disincentives which may influence, support implementation and adoption of control strategies. Nicholas holds a Ph.D. in Livestock productions systems, Master of Science in Livestock Production Systems from the University of Nairobi. My current research projects include a value chain-based control of *Taenia solium* in northern Uganda and *Taenia solium* risk mapping in Uganda and Malawi. |
| Thesis Title | Factors affecting the design of integrated strategies for the control of T*aenia solium* infections in Kamuli and Hoima districts, Uganda |
| Thesis Abstract(Max 250 words) | *Taenia (T.) solium* is a zoonotic parasite causing three diseases: - Taeniasis and cysticercosis in humans and porcine cysticercosis in pigs.The life cycle is entirely dependent on the transmission between humans and pigs and therefore, breaking the transmission paths can lead to total elimination of the worms(Gemmell et al., 1983). Different interventions to break the transmission cycle exists and have been trialled in different combinations resulting to varying levels of impact. The success or failure of control interventions tested in different endemic areas of the worldmay be attributed to the consideration or failure to consider the context. In the first part of the study, the contextual factors that may influence the success of interventions in the different endemic settings globally were investigated. Context refers to the features of the circumstances where an intervention is conceived, developed, implemented and evaluated and is made up of several factors here in referred to as contextual factors. In the second part, using Uganda as an example of an endemic country, the epidemiological status of *Taenia (T.) solium* and other pig gastrointestinal parasites as well as the stakeholder knowledge, attitudes, and practices on the control of *T. solium* infections was investigated. The objectives of the study were: -1. To determine the context and enabling environment for the success of control interventions against *Taenia solium* infections in endemic settings.
2. To determine the epidemiological and coinfection status of pigs with porcine cysticercosis and gastrointestinal parasites in Kamuli and Hoima districts, Uganda.
3. To determine the stakeholders’ knowledge, attitudes, and perceptions which may influence the adoption of *T. solium* infections control strategies in Uganda.

To assess the contextual factors and enabling environment influencing the success of interventions across different endemic regions of the world, data were collected through systematic literature review (SLR) and key informant interviews (KII). The SLR focused on studies that implemented *T. solium* control interventions and was used to identify the contextual factors and enabling environment relevant to successful planning, implementation and evaluation of the interventions.  To further highlight the importance and linkage of the contextual factors and control interventions, KII were conducted through skypeTM with 11 researchers or implementers of the studies included in the SLR. A cross-sectional study was conducted in Kamuli and Hoima districts to determine the prevalence of *T. solium* infection in pigs and the risk factors, the prevalence and intensity of pig gastrointestinal parasites and the co-infection status. A total of 294 pig sera was collected from 161 households across the two districts and tested for *T. solium* cysticercosis circulating antigens using commercially available Enzyme-Linked Immunosorbent Assay (ELISA) kits. A total of 291 pig fecal samples were also collected and pig parasite eggs identified and quantified using the McMaster slide technique. A household level questionnaire was administered using Open Data Kit (ODK) to collect data on the putative risk factors for infection of pigs with *T. solium* cysticercosis. To further highlight the knowledge, attitudes and practices that may influence *T. solium* control in Uganda, data was collected using focus group discussions (FGD) with pig farmers, community leaders, animal health officers, community health officers and pig/pork traders. Additionally, KIIs were conducted with senior officials in Uganda in the ministries of livestock and health, local non-governmental organizations and private companies promoting pig rearing. Data analysis and management for the qualitative data was carried out in NVIVO Version 12. For the cross-sectional survey data, both univariable and multivariable analysis were conducted using generalized mixed effect models (GLMM) in R. The SLR identified 41 publications, globally, that had considerations of the contextual factors. They were grouped into efficacy (10), effectiveness (28) and scale up or implementation (3) research studies. The identified contextual factors included epidemiological, socioeconomic, cultural, geographical and environmental, service and organizational, historical and financial factors. The enabling environment was mainly defined by policy and strategies supporting *T*. *solium* control. The apparent animal level seroprevalence for PCC was 4.8% (95% CI 2.7 – 7.1) and was different across the two districts (P = 0.018, Fisher exact test). At herd level, the prevalence was 9.7% (5.5 – 14.4). The prevalence of the different nematode eggs and coccidia oocysts in the two districts were as follows: Strongyles 79.0% (95% CI 74.3 – 83.6), Coccidia 73.3% (95% CI 68.3 – 78.6), *Trichuris* spp. 7.4% (95% CI 4.9 – 10.6), *Strongyloides ransomi* 2.1 (95% CI 0.7 – 3.5), *Ascaris* spp. 4.9 (95% CI 2.8 – 7.4). Overall, across the two districts, the arithmetic mean for the oocysts per gram (OPG) for coccidia was 2042.2±5776.1 and eggs per gram (EPG) was highest for strongyles 616.1±991. Overall, 57.4% of the porcine cysticercosis seropositive pigs were also positive for at least one of the gastrointestinal helminths that included strongyles, *Strongyloides ransomi*, *Trichuris* spp. and *Ascaris* spp. The results of multivariable analyses identified the knowledge that pigs could be infected by *T. solium* by eating dirt feeds as a significant predictor of herd-level PCC seropositivity, OR 5.5 (95% CI 0.7 - 43.8) p=0.005. Results from the FGDs with the various stakeholder categories showed that there was differential, limited and fragmented knowledge levels on *T. solium* infections among stakeholders. Pig farmers, community leaders and pig/pork traders had almost no knowledge and was confounded by knowledge on other worm infections in pigs and humans. Deworming of children was well received but was mainly pushed by government programs that were supported by international donor agencies. Pig confinement, pit latrine construction, coverage, maintenance and sustained use was determined by the cultural, socio-economic and physical or environment factors of the target population and area. Mass drug administration for school children and adults, vaccination of pigs with TSOL18 vaccine plus treatment with oxfendazole and health education were widely acceptable to the local stakeholders but with conditions needed for their successful adoption including subsidization of the prices for the vaccine and dewormer as well as proper sensitization and wide coverage for the programme.The effect of contextual factors on efficacy, effectiveness and scale-up studies varies and the factors that include - epidemiological factors, socioeconomic and cultural factors, geographical and environmental factors, service, and organization factors interact to influence the implementation and outcomes of *T. solium* control projects. Knowledge that pigs can get infected by eating dirty feeds was found to be a significant predictor for *T. solium cysticercosis* seropositivity at household level. The prevalence for infection with any gastrointestinal parasite was high and similar across the two districts. There was also a high likelihood of infection of pigs with multiple helminth infections and PCC. Knowledge does not always translate to practice and therefore innovative ways of triggering change of practice may be necessary including incentives and dis-incentives to reinforce good practices and deter negative practices. Further studies are required to test the feasibility of use of oxfendazole and cost benefit analysis in the control of *T. solium* cysticercosis and some of the gastrointestinal worms in pigs. |
| Student’s Google scholar link(affiliated to student’s university email) | <https://scholar.google.com/citations?user=TDd2UqcAAAAJ&hl=en>  |
| Other relevant academic links |  <https://www.researchgate.net/profile/Nicholas-Ngwili> |
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